Pelican Spruce Mills Ltd.

FMA Planning and Harvesting

Ground Rules

STURDI-WOOD
BY PELICAN MILLS

Alberta
FORESTRY, LANDS
AND WILDLIFE
Forest Service

PELICAN SPRUCE MILLS LTD.

FOREST MANAGEMENT AGREEMENT

PLANNING AND HARVESTING

GROUND RULES

Alberta
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Forest Service

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FOR ADDITIONAL COPIES OF THESE GUIDELINES, CONTACT:

Information Centre
Forestry, Lands and Wildlife
Main Floor, Bramalea Building
9920 - 108 Street
Edmonton, Alberta, Canada T5K 2M4

Telephone: (403) 427-3590

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1.0 INTRODUCTION

1.1 Pelican Spruce Mills Ltd. Forest Management Agreement

These ground rules have been developed by the Alberta Forest Service (AFS). They have been reviewed with the agreement holder to provide direction in planning and harvesting operations on the Forest Management Agreement (FMA) (O.C. 796/85). These ground rules will be subject to revision five years after their publication.

The ground rules outline the objectives and standards that are expected to be met during harvest planning and operations. It is recognized there will be exceptions or unusual conditions to which these standards cannot be strictly applied. In keeping with sound forest management practices, reasonable adjustments best suited to the requirements of each specific situation are expected to be used. They are intended to be applied with sound judgement, practical experience and technical competence.

The Forest Superintendent has the authority to waive or amend the application of these ground rules in any single specific instance, except when another Alberta Forest Service authority has the jurisdiction, ie. approval comes from Timber Management Branch Director. Any amendment must be done in writing and must be consistent with the Forest Management Agreement, the Forests Act and Regulations thereto, the Brazeau/Pembina Integrated Resource Plan (IRP), Rocky/North Saskatchewan IRP and all other provincial statutes.

It is expected that these standards will be adhered to unless stated otherwise in the approved operating plans, or as amended at the discretion of the Forest Superintendent.

2. PLAN SUBMISSION REQUIREMENTS

1. Referrals to renewable resource specialists dealing with the forest landscape, recreation, watershed and wildlife shall be conducted at the Management Plan, General Development Plan (GDP) and Annual Operating Plan (AOP) levels to ensure consideration of concerns and timely input to planning. Referrals at the operational level will be made only at the preliminary AOP stage with no further referrals beyond the "approved-for-layout" stage, unless notable changes have since occurred.

   Input into operating plans shall be at a level of detail sufficient to provide adequate direction to the Company for plan preparation. The referrals and the input to planning shall be co-ordinated by Forest Headquarters.

   It is expected that the Company will be sufficiently familiar with ground conditions in the area to be harvested to develop the plan and be able to incorporate identified resource concerns.

2. The Company shall submit an Annual Operating Plan by January 1 of each year in accordance with Section 12 of the Forest Management Agreement, and cover an operating year from May 1 to April 30.

   The plan shall be prepared in accordance with the Appendix and be approved before any operations may be conducted.

3. The Company shall make such necessary resource surveys and assessments as a basis for operational planning. The results must achieve the objectives specified in these ground rules. Survey results shall be provided in the Annual Operating Plan to support the proposed access and harvest layout.

4. The Company shall prepare a five-year General Development Plan based on the management plan harvest sequence, to be submitted as part of the Annual Operating Plan. This plan shall illustrate the cut sequence and road development for a five-year operating period.

5. The Annual Operating Plan shall include two years of definite road and harvest layout and two years of preliminary layout.

6. Detailed plans shall be submitted, as directed in these ground rules, where necessary for road construction, stream crossings, logging, reforestation and reclamation activities on critical or sensitive sites.

7. Cutblocks scheduled for harvest in the upcoming operating year should be laid out in the field for inspection by a Forest Officer before submission of the Annual Operating Plan.

3.0 PLANNING CONSIDERATIONS AND HARVESTING CONDITIONS

3.1 Planning and Harvesting Principles

1. The harvest sequence reflects the objectives defined in the management plan for the Forest Management Agreement. Logging operations shall follow the approved harvest sequence of cut plan areas in the management plan.
2. Cut plan area boundaries shall follow natural breaks in topography, stand types, subwatershed divides, permanent watercourses and/or major roads.
3. Harvest layout shall be based on detailed assessments of stand and site conditions and shall meet the requirements of sound forest management.
4. Alternate clear cutting in blocks and patches shall be the basic cutting system adopted. This will normally be done in two passes, where the second cut will be approximately equal to the first in area, volume, operability and quality. This shall not preclude the use of selective, experimental or other cutting systems.
5. Approximately 50 per cent of the merchantable volume, covering approximately 50 per cent of the merchantable area, may be harvested in the first cut (unless approved otherwise) with the balance taken in the second cut. This is to:
   - minimize the impact on watershed, wildlife, aesthetics and site productivity;
   - break up the continuity of slash fuels and forest cover types; and
   - reduce susceptibility to insect and disease infestation agencies.
6. Stands projected to become merchantable before the second pass should be addressed in the original layout design.

The Company may be required to vary the number of cuts and the percentage removal in any single area to alleviate key concerns.

A three-cut system may be implemented at the time of the second pass if a significant number of stands have become merchantable that were not considered in the original harvest design. This should be considered where total removal of the remaining stands would exceed 50 per cent of the total planning area or where cutblock sizes would be excessive.

7. Second-Cut Removals:

(a) Deciduous Operations.

Removal of the second cuts in healthy deciduous stands will not be approved until deciduous regeneration on adjacent initial cuts has met acceptable stocking level standards and has reached a minimum height of 3 m. This is to assist watershed protection to reduce the visual impact of logging and to provide minimal cover for wildlife. It is expected that deciduous regeneration will reach the height of 3 m within 10 years.

The retention period for second cuts in overmature deciduous stands may be shortened if there is a serious risk of stand degradation.

(b) Coniferous Operations.

Removal of the second cuts in coniferous operations will not be approved until coniferous regeneration on adjacent initial cuts has met acceptable stocking level standards and has reached a minimum height of 2 m. This is to assist watershed protection

to reduce the visual impact of logging and to provide minimal cover for wildlife. It is expected that coniferous regeneration will reach the height of 2 m within 20 years.

The retention period for second-cut removal may be extended to allow coniferous regeneration to reach a specified height greater than 2 m in key visual, watershed or wildlife areas. The retention period may be shortened when there is a serious risk of stand degradation.

8. Integrated hardwood-softwood management and harvesting shall be practiced on designated areas to fully use the available allowable cut and to meet the demand for both deciduous and coniferous timber.
9. Interests and concerns of the general public shall be considered during harvest planning and operations; the management objectives of other resource agencies shall be integrated with those of timber management.
10. Timber harvesting in the Eastern Slopes shall be conducted according to the management guidelines specified in A Policy for Resource Management of the Eastern Slopes (ENR Report No. T/38).

In those regions of the Forest Management Agreement area covered by the Pembina/Brazeau and Rocky/North Saskatchewan Integrated Resource Plans, timber harvesting shall be conducted according to these plans.

11. Harvest design and operations shall be conducted in a manner that maintains or improves the productivity of the site. Degraded sites shall be restored using acceptable reclamation procedures.

3.2 Timber Management Criteria

3.2.1 Utilization

1. Deciduous Utilization

   (a) A merchantable deciduous stand is a stand where the net volume of merchantable trees is 50 m^3 per ha or greater.

   (b) A merchantable deciduous tree is defined as one with a minimum stump diameter of 17 cm outside bark and a merchantable length of 5.2 m or greater (including allowance for trim) up to a 10 cm top diameter inside bark or to the point where heavy branching prevents use.

   (c) A merchantable log or broken piece contains a minimum of 50 per cent sound wood in basal area at the butt (larger end). It is 2.6 m in length (including allowance for trim) to a 10 cm small end diameter inside bark; there is no excessive amount of crook or sweep rendering it unusable.

   The Company shall not be expected to manufacture merchantable logs from non-merchantable trees.

   Larger end diameters exhibiting rot greater than 50 per cent in basal area may be bucked at a maximum of 0.61 m intervals to 50 per cent sound wood in basal area. Logs or pieces are not to be cut to 2.6 m lengths until 50 per cent sound wood in basal area is obtained.

2. Coniferous Utilization

   (a) A merchantable coniferous stand is a stand:

      (i) where the net volume of merchantable trees is 50 m^3 per ha or greater;

(ii) in which 60 per cent of the coniferous stems must be 15 cm or greater in diameter (outside bark) at stump height. To establish the population, all stems 7 cm or greater in diameter (outside bark) at breast height will be included; and

(iii) where the average height of all merchantable trees in the stand is 14 m or greater;

(b) A merchantable coniferous tree is defined as one with a minimum diameter of 15 cm outside bark at stump height and a merchantable length of 3.66 m or greater to a top diameter inside bark of 10 cm.

(c) A merchantable coniferous log or broken piece contains a minimum of:

- 50 per cent sound wood and is
- 2.44 m in length to a 15 cm small end diameter inside bark (excluding allowance for trim); or
- 3.66 m in length with a 15 cm large end diameter outside bark to a 10 cm small end diameter inside bark (excluding allowance for trim), for 15/10 utilization.
- Butts (larger ends) exhibiting rot greater than 50 per cent in basal area may be bucked at a maximum of 0.61 m intervals to 50 per cent sound wood in basal area.

3. All merchantable standing or merchantable, fallen dead timber shall be used.

4. Merchantable trees shall be bucked into merchantable log lengths.

5. Breakage or mechanical damage to merchantable trees shall be kept to a minimum.

6. Broken pieces, originating from a merchantable tree, that meet or exceed the minimum piece size specifications shall be used.
7. Merchantable trees shall be decked in a manner that avoids waste.
8. All timber shall be removed for manufacture within one year of felling.
9. Unmerchantable live residual trees shall be left standing unless otherwise approved.
10. Thrifty coniferous understories of acceptable species shall be protected from unnecessary damage during logging of hardwoods where the density of the understory is equal to or greater than 250 stems per hectare. In such instances, harvesting operations shall be modified to ensure damage to the coniferous understory is kept to an acceptable minimum.

3.2.2 Overlapping Deciduous and Coniferous Operations

1. Coniferous and deciduous operations shall be integrated to provide for the maintenance of existing allowable cuts and full use of the timber resource.
2. Harvest layout design shall include all merchantable coniferous and deciduous stands. However, block layout and harvest sequencing will be done in a manner that will keep the annual harvest of conifers within the Annual Allowable Cut (AAC).
3. Sequencing priority should be given to those stands where both coniferous and deciduous species are of merchantable size and of rotation age or older.
4. All merchantable-size trees within a cutblock, whether coniferous or deciduous, shall be harvested at the same time.

5. Excluding salvage, coniferous operators within the FMA shall not harvest deciduous timber unless they have a contract with Pelican Spruce Mills Ltd.
6. All harvested areas within the deciduous land base shall be regenerated to aspen, unless otherwise directed and approved through the management plan. If the cutover is to be converted to conifer, the area must be reforested to provincial standards for coniferous regeneration.
7. All harvested areas within the coniferous land base shall be regenerated to conifer, unless otherwise directed and approved through the management plan. If the cutover is to be converted to deciduous, the area must be reforested to provincial standards for deciduous regeneration.

3.2.3 Timber Condition

1. Timber that is the oldest and in the poorest condition shall be removed in the first cut, wherever feasible.
2. Stands containing severe blowdown, infestation by insects or disease, dead or other high risk timber, shall be given high priority for removal. A harvesting proposal, such as progressive clear cutting, that differs from normal layout design may be submitted for consideration. Such proposals must be based on factual information obtained from stand and site assessments.
3. Healthy, vigorous stands shall be retained as part of the second cut wherever possible.

3.2.4 Operability

1. Slope, soil, timber volumes and types of logging equipment must all be considered when planning logging operations, reforestation treatments

and reclamation on steep slopes. The objective is to ensure that soil disturbance, erosion and watercourse sedimentation are kept to an acceptable minimum.

The intensity of planning shall be determined by the complexity and sensitivity of the site conditions and the degree of disturbance expected.

2. Harvesting on slopes steeper than 45 per cent should not be done with conventional wheeled skidders. Alternative equipment such as tracked skidders, high flotation wheeled skidders and cable yarders should be considered for logging slopes greater than 45 per cent and for logging on sensitive areas.

3.2.5 Cutblock Layout Requirements

1. All merchantable stands in a cut plan area shall be included in the cutblock layout plan unless they are located in an area excluded (temporarily or permanently) from timber harvesting. The policy for harvesting timber is to remove oldest timber first. Thus, priority must be placed on including mature and overmature timber in the blocks designated for first cut.

   Any stand which has good potential for becoming merchantable before completion of the second cut normally should be included in the total harvest design.

2. Cutblock boundaries should follow natural terrain features, contours and timber-type boundaries where possible to minimize the impact on watershed, blowdown, and aesthetics; and to benefit wildlife, silviculture and logistics of harvesting.

3. Second-cut stands should be interspersed evenly among first-cut stands and be of similar size.
4. Access to cutblocks scheduled for second cuts and the logistics of extracting timber from these blocks shall be considered in the design of the first-cut blocks.
5. Permanent sample plots shall be shown on current forest cover maps and shall be reserved from harvesting and protected from blowdown. In an exceptional case, a plot may be approved for harvest. Such a plot shall not be disturbed until it has been remeasured and the cutblock released for harvesting by the Alberta Forest Service.
6. Windfirm buffers shall be identified and used where feasible to alleviate harmful impacts of blowdown on aesthetics, watercourses, fisheries and wildlife.

Buffer areas are to be managed differently from cutblocks. Removal of merchantable timber may be considered if done by partial cutting or alternate clear cutting at a smaller scale, provided that the integrity of the buffer is maintained. Cutovers within buffer areas shall be reforested to provincial standards, but in the case of protective buffers along waterbodies, by a method that will not contribute to sedimentation.

3.2.6 Block Size

1. Block size, width and shape should be determined by regeneration and silvicultural requirements of the species being managed, and by consideration of aesthetics, watershed and wildlife. Size and shape of cutblocks are expected to vary to fit the terrain and stand types. The microclimate of the proposed cutover must also be considered; special

measures shall be taken where the need to conserve soil moisture is identified.

2. Deciduous cutblocks shall average no more than 60 ha, but may vary up to 100 ha in size.

3. Coniferous Operations:

   (a) Spruce Blocks: Cutblocks in spruce stands may be laid out in:

      (i) patches to a maximum of 24 ha;

      (ii) strips to a maximum of 32 ha where no part of the cutover is further than 150 m from a seed source; or

      (iii) blocks to the dimensions specified for pine stands. This shall be done at the discretion of the Forest Superintendent where the Company makes a formal written commitment to prepare the site if necessary and plant the cutover within 24 months of harvesting.

   (b) Pine Blocks: Stands in which 40 per cent or more of the merchantable timber volume is in pine, may be laid out to pine standards. The cutblocks shall average no more than 60 ha, but may vary up to 100 ha in size.

4. The Company must support proposals to exceed block size limits with factual documentation obtained from stand and site assessments. Harvest layout must demonstrate that potential harmful impacts on soils, watershed, wildlife, aesthetics and other values are alleviated.

The proposal must also include an acceptable plan for reforestation that is appropriate for the site conditions before harvest approval.

5. Cutblocks in previous selectively cut stands which are satisfactorily stocked to conifers, 2 m or more in height, may exceed the size constraints. This is provided that regeneration is not destroyed during logging to below the minimum stocking level, and is comprised of good quality conifers.

   If the regeneration stocking cannot be maintained at the time of harvest, the appropriate alternate cut-and-leave system will be implemented.

3.2.7 Contingency Planning

1. The Company shall identify summer harvesting and hauling areas or other alternatives in the Annual Operating Plan to overcome unforeseen emergencies in supplying the mill.
2. Accessible second-year blocks that have been approved for layout may be designated in the Annual Operating Plan to satisfy contingency needs.
3. Logging and scarification with heavy equipment shall be stopped during wet soil conditions to avoid excessive soil damage. Contingency cutblocks may be considered as alternative working areas in these cases.
4. Written authority from the Forest Superintendent is required before harvesting a contingency cutblock.

3.3 Reforestation

1. All cutover lands and non-stocked supplemental areas shall be reforested in accordance with terms of the Forest Management Agreement and the Timber Management Regulation.
2. Reforestation plans shall be submitted with, or as, an addendum to the Annual Operating Plan. Included will be an updated reforestation summary in Tables 1 and 2 giving the status of reforestation work completed and work proposed, as per the Appendix.

TABLE 1

WATERCOURSE CLASSIFICATION

Watercourse Classification	Physical Description	Portion of Year Water Flows	Channel Development	Land Use Impact	Fisheries Concerns
Large Permanent	- major streams or rivers - well defined flood plains - valley usually exceeds 400 metres in width	- all year	- unvegetated channel width greater than 5 metres	- water quality often reflects all upstream land use impacts and natural erosion processes	- resident fisheries (most important of entire fisheries habitat)
Small Permanent	- permanent streams - often small valleys - bench (flood plain) development	- all year but may completely freeze in the winter	- banks and channel well defined - gravel and rubble usually present in channel - channel width 0.5 to 5 metres	- water quality - fisheries populations sensitive to siltation	- significant insect populations - spawning and seasonal habitat during higher flow periods - resident fish populations in larger streams
Intermittent	- small stream channels - small springs are main source outside of periods of spring runoff and heavy rainfall	- during wet season or during storms - dries up during season of drought	- distinct channel development - usually channel is non-vegetated - channel width to 0.5 metres - some bank development	- deposition of sediment during flow periods will damage fish and invertebrate habitat and effect higher order streams into which it flows	- production area for important food sources - drift invertebrate populations in pools and riffles - blockages prevent fish passage for spawning
Ephemeral	- often a vegetated draw	- flows only during and immediately after rainfall or snowmelt	- little or no channel development - channel is usually vegetated	- sediment production during flow periods as a result of soil disturbance	- only as influence on water quality downstream
Water Source Area	- areas with saturated soils and/or surface flow is occurring - seepages, springs muskegs	- all year - may or may not freeze in the winter	- no channel development - usually vegetated	- can be a source area directly into a larger watercourse	- only as influence on water quality downstream

TABLE 2

OPERATING GROUND RULES FOR WATERCOURSES

Watercourse Classification	Mapping Designation	Roads, Landings, Bared Areas	Watercourse Protective Buffers	Operating Conditions Within Buffers and Water Source Areas	
				Tree Felling	Equipment Operation
Large Permanent	- solid heavy line or double line	- not permitted within 100 metres of the highwater mark without the written approval of a Forest Officer	- no disturbance or removal of merchantable timber within 60 metres of the highwater mark except where specifically approved in writing following inspection by a Forest Officer	- trees will be felled away from the watercourse within these areas - no slash or debris is to enter the watercourse - should slash or debris enter the watercourse, immediate removal is required without the machine entering the watercourse	- heavy equipment may only operate within water source areas and high-water mark areas during dry or frozen periods, subject to specific operating conditions - during unfrozen or wet periods, equipment is to remain outside these areas while removing timber
Small Permanent	- usually solid lines though some are heavy broken lines	- not permitted within 100 metres of the highwater mark without the written approval of a Forest Officer	- no disturbance or removal of merchantable timber within 30 metres of the highwater mark except where specifically approved in writing following inspection by a Forest Officer	- trees are to be felled away from the watercourse within these areas unless otherwise approved in writing by a Forest Officer - no slash or debris is to enter the watercourse - should slash or debris enter the watercourse, immediate removal is required without the machine entering the watercourse	- heavy equipment may only operate within water source areas and highwater mark areas during dry or frozen periods, subject to specific operating conditions - during unfrozen or wet periods, equipment is to remain outside these areas while removing timber
Intermittent	- usually broken light line - should be identified on ground	- not permitted within 30 metres of a watercourse	- buffer of brush and lesser vegetation to be undisturbed along the channel - width of buffer will vary according to soils, topography, water source areas and fisheries values - treed buffer is not required unless specifically requested by a Forest Officer	- trees are to be felled away from the watercourse wherever practical - large accumulations of slash or debris in the channel will be removed progressively	- where fish spawning movements have been identified, special crossings must be provided - random skidding in and through the channel or water source areas will only be permitted during frozen conditions - planned and adequate crossings will be required during unfrozen periods to prevent rutting and minimize soil exposure - where temporary crossings have been constructed, removal will be required unless retention is

					authorized in writing by a Forest Officer - operations shall be conducted in a manner that minimizes disturbance to the duff layer and soil
Ephemeral	- not identified on maps - should be identified on the ground and illustrated on an operations map if recommended by the site assessment	- construction not permitted within a watercourse or a water source area	- not required		- as per intermittent watercourses except for the following: (i) heavy equipment may cross only when activity will not result in any erosion and sedimentation (ii) planned and adequate crossings will be required during wet periods to prevent rutting and minimize soil exposure
Lakes - little or no recreation waterfowl, or sport fishing potential	- solid line	- not permitted within 100 metres of the highwater mark without the written approval of a Forest Officer	- on lakes exceeding 16 ha in area, there will be no disturbance or removal of timber within 100 metres of the highwater mark except after inspection and approval by a Forest Officer	- trees within these areas are to be felled away from the water body - no slash or debris is to enter the water	- heavy equipment may only operate within the highwater mark or water source areas during dry or frozen periods, subject to specific operating conditions - during unfrozen or wet periods, equipment is to remain outside the high-water mark while removing timber
Lakes - with recreational, waterfowl, or sport fishing potential	- solid line - lakes will be identified by the Department of Energy Natural Resources and the Company advised - reserved areas will be indicated on the appropriate maps	- for the shorelines not located within reserved areas, no disturbances will be permitted within 200 metres of the highwater mark without written approval of the Forest Superintendent	- on lakes exceeding 4 ha in area, there will be no disturbances or timber removal within 100 metres of the highwater mark, except after inspection and approval by a Forest Officer	- trees within these areas are to be felled away from the water body - no slash or debris is to enter the water body	- heavy equipment may only operate within the highwater mark or water source areas during dry or frozen periods, subject to specific operating conditions - during unfrozen or wet periods, equipment is to remain outside the high-water mark while removing timber - consideration must be given to aesthetics when harvesting adjacent to lakes with recreational potential - any timber harvesting within reserved areas shall be conducted subject to specific operating conditions

NOTE: Scarification treatment will be permitted within water source areas and the highwater mark of any watercourse or lake during dry or frozen periods provided that disturbance is kept to a minimum by spot scarifying or other appropriate methods. Equipment must be kept away from the banks of watercourses or shores lakes. Scarification equipment shall only be permitted to cross a watercourse at improved crossings or during frozen periods to protect the banks and streambed from disturbance.

3. All cutover deciduous lands shall be treated in such a way as to promote natural suckering of aspen.
4. Reforestation techniques conducive to enhanced growth and yield of regenerated stands should be employed. This may be accomplished through any or all of the following:
   (a) matching of species to site;
   (b) control of spatial distribution of crop trees; and
   (c) site treatment to enhance the micro and macro environment for seedling establishment and growth.
5. The preferred conifer reforestation method from the perspective of enhancing growth and yield potential is to plant genetically-improved seedling stock as it becomes available.

   Reforestation methods will vary according to the regeneration characteristics of the managed species and must be properly adapted to the site conditions.
6. The arrangement of blocks, patches and strips designated to be cut over or retained should be designed to meet the silvicultural requirements of the stands being managed.
7. Whenever conditions permit, individual cutblocks should be confined to areas which require similar reforestation treatments, to accommodate efficient and effective reforestation.
8. Cutblocks shall be designed and operations shall be conducted in a manner that will prevent damage to regeneration on previous cutovers when second or subsequent pass blocks are harvested.
9. Reforestation treatment shall be conducted in a manner that minimizes soil erosion and watercourse sedimentation.

10. Scarification treatments will be permitted within water source areas and on areas subject to normal seasonal flooding during dry or frozen periods. This is provided that disturbance is kept to a minimum and will not channel runoff directly into the watercourse. Equipment must be kept away from the watercourse and the banks must not be disturbed.

    Scarification equipment shall only be permitted to cross a watercourse at improved crossings, or during frozen periods, to protect the banks and streambed from disturbance.

11. Road tenure and reclamation planning shall consider reforestation treatment scheduling.

3.4 Forest Protection

1. The Company shall submit a Fire Control Plan with the Annual Operating Plan or as an addendum in accordance with the Forest Control Agreement.
2. Firefighting equipment shall be on hand and maintained as prescribed in the Forest and Prairie Protection Act and regulations thereto, and any operating conditions agreed to in the Fire Control Agreement.
3. Debris disposal and slash hazard reduction shall be completed progressively in accordance with the Forest and Prairie Protection Regulations Part II, and the Logging Slash Hazard Evaluation and Prescribed Burning Manual (1976).
4. Proposals for prescribed burning for slash hazard reduction or silvicultural treatment shall be submitted as part of the Annual Operating Plan, with a cutblock design that accommodates effective burning and fire control. A detailed burning plan shall be submitted as an addendum to the AOP, and shall include:

(a) detail on terrain, watercourse and fuel types;

(b) the location of cutblock boundaries, roads, landings and skid trails; and

(c) the burning and control prescription for each cutblock.

3.5 Forest Landscape Management

1. The Forest Landscape Management Guidelines shall be applied to identify visual resources, their sensitivity and vulnerability, and to set objectives for their management.
2. In visually sensitive areas, the guidelines shall be applied to help determine the visual impact potential of proposed harvest operations.
3. In harvest operations with significant potential for visual impact, the guidelines shall be applied during the appropriate planning, operational and post-harvest treatment phases to help avoid or alleviate adverse visual impact contrary to visual management objectives and good forest management practices.

3.6 Watershed Protection

1. Operations shall be conducted in a manner that minimizes soil disturbance and surface flow of water over exposed mineral soil so that the volume of sediment entering the watercourse is reduced.
2. Watercourses shall be evaluated and classified according to Tables 1 and 2 to determine protection requirements and to assist in the planning and supervision of operations.
3. Buffers shall be established to prevent mineral soil disturbance and maintain a protective cover of duff and lesser vegetation adjacent to watercourses.

4. Water source areas, and areas subject to normal seasonal flooding, may be logged during dry or frozen periods according to specific operating conditions contained in the approved Annual Operating Plan. The objective is to minimize disturbance to the duff layer and exposure of the mineral soil.

   Construction of spur roads in water source areas shall be confined to frozen periods when there is snow cover.

3.7 Wildlife Habitat

1. Timber harvesting is recognized to have a significant impact on the management of fish and wildlife and will be conducted in a manner that is compatible with objectives of the Fish and Wildlife Division.
2. The Fish and Wildlife Division is expected to identify important wildlife species, their key areas and major management requirements. This information will be provided to the Alberta Forest Service at least five years in advance of cutting based on the General Development Plan. Detailed wildlife concerns and management opportunities will be addressed at the stand assessment and the preliminary cutblock design phases of the Annual Operating Plan submission.
3. The design of harvest layout, the construction and tenure of access roads, and the organization of logging operations are to be conducted in a manner that is sensitive to the needs of wildlife species that have been designated as important in the Forest Management Agreement Area. This is to ensure for a balance of food, cover and protection to maintain or enhance viable populations. Block width and line of sight are the most important factors in cutblock design from a wildlife perspective.

4. Buffer areas shall be established where required and as identified at the operational cruise stage. Examples of where buffers are required include the retention of riparian vegetation along watercourses, and the provision of protective cover along ungulate travel corridors, around natural meadows and mineral licks.

5. The Company shall contact all registered trappers who will be affected by proposed timber harvesting, and provide them with a copy of the five-year timber harvest projection plan as well as with copies of all subsequent revisions.

The Company should discuss the harvesting plans with the trapper(s) during development of Annual Operating Plans to identify concerns, determine if a need exists for plan revisions and resolve conflicts.

Traditional access trails or suitable alternatives shall be retained.

Trapline cabins and trails shall be indicated on the annual operating plan map if that information is known or has been provided by the trapper(s), Fish and Wildlife Division or the Alberta Forest Service.

A reasonable effort shall be made at contacting and advising trapper(s) again at least 10 days before commencing operations.

4. ROAD PLANNING AND CONSTRUCTION

4.1 Road Planning and Construction Schedule

The Company shall submit a schedule for road planning and construction as part of the General Development Plan. The general location of a proposed road should be indicated on the General Development Plan map.

4.2 Planning Permanent Roads

Road planning and construction is to be conducted in accordance with the Resource Road Planning Guidelines for the Green Area of Alberta (ENR Report No. T/25). A summary of these guidelines is presented here to provide direction for the planning and construction of roads.

This procedure outlines the planning process to be followed. The purpose of planning is to minimize environmental impact. The level of planning required is determined by the road standard, the complexity of terrain and the degree of disturbance that will occur. The details required for plan submissions are determined at each planning phase.

The Company shall submit plans in three phases, with increased levels of detail, for all permanent roads to be built under authority of a Licence of Occupation or an approved Annual Operating Plan. A permanent road is one that will exist for two years or more and includes seasonally-used roads.

Proposed roads shall be identified by class in relation to their expected life, use and design specifications as listed in Table 3.

1. Phase I - Regional Corridor Plan. The regional corridor plan shall outline the general location of a road (plus or minus 1 km) and justify the need for a proposed road. This level of planning includes location, assessment and comparison of alternative corridor locations based on terrain analysis at 1:50 000 - 1:100 000 map scale.

   During Phase I preparation and approval, the planning requirements for the detailed plan should be identified.

2. Phase II - Detailed Planning. The objective of the detailed plan is to select a route that minimizes environmental impact and optimizes timber harvesting and hauling efficiency. The detailed road plan should include one or any of the following:
   (a) 1:15 000 scale Phase III maps showing the route alignment and stream crossings;
   (b) Aerial photographs, aerial photo mosaics or orthophoto maps indicating route alignment;
   (c) Survey profiles of the centre line, where required;
   (d) Cross-sectional profiles for approaches to streams and for routes on steep terrain requiring side hill cuts;
   (e) Descriptions of watercourse crossings and the procedure used in determining the size and type of crossing structure;
   (f) Statement identifying key factors that influenced final route selection; and

TABLE 3

ROAD STANDARDS

ROAD DESCRIPTION		ROUTE SELECTION PROCESS		ENVIRONMENTAL		DESIGN AND																	
Road Class	Term Of Life	Phase I	Phase II	Detailed Plan Preparat	Field Layout	Right of Way							Alignment										
						Clearing Width	Back Slopes		Fill Slopes		Road Surface	Drainage Ditch	Gradients				Sight Distance	Minimum Radius of Curve	Design Speed	Locati before comme for m water clear Dog-l access angle right- Borro the r be in able ing.
							N	E	N	E			F		A								
													S	P	S	P							
I	Permanent	Phase I	Phase II	Detailed design plan on air photos or photo mosaics. Cross sectional profiles for stream crossings and cuts and fills over 1.5 m. Types of structures for stream crossings, erosion control measures, hydrological information, revegetation and reclamation plans required. Right-of-way requirements specified and where any additional requirements may be necessary.	Centerline and stations marked before AFS field inspection. Both sides of right-of-way to be marked before construction commences. Cuts and fills over 1.5 m must be staked. Any additional right-of-way requirements to accommodate cuts and fills will be determined during AFS inspection for approval.	45 m	2:1	3:1	25:1	3:1	10 m	Rounded or Scraper	5	7	4	5	180 m	300 m	90 km/h	
II	Permanent	Phase I	Phase II	See class I	See class I	30 m	2:1	3:1	25:1	3:1	10 m	Rounded or Scraper	6	8	5	6	150 m	230 m	80 km/h	See cl
III	Permanent	Phase I	Phase II	See class I	See class I	20 m	2:1	3:1	25:1	3:1	8 m	Rounded or Scraper	8	10	6	8	90 m	120 m	60 km/h	See cl
IV	Permanent	-	Phase II	See class I	See class I	10-20 m	2:1	3:1	25:1	3:1	6 m	See class IV temporary	10	12	8	10	45 m	50 m	40 km/h	See cl
IV	Temporary	-	Phase II	Road alignment plan on aerial photographs and forest cover maps. Profiles of critical areas (cuts, fills, and stream crossings). Types of structures for stream crossings.	Centerline marked for AFS field inspection. Both sides of right-of-way marked before construction commences.	10-20 m	2:1	3:1	25:1	3:1	6 m	"V" ditches where required. Ditches should be rock lined where site specifics (grade and slope) may dictate their use.	10	12	8	10	45 m	50 m	40 km/h	Use o Incorp of-wa
V	Temporary	-	Phase II	See class IV temporary	See class IV temporary	8-20 m	2:1	3:1	25:1	3:1	5 m	See class IV temporary	12	14	12	14	-	-	-	

a. For temporary Class IV and V roads, centerlines shall be marked for inspection on critical or sensitive locations and when requested by a Forest Officer. When such marking is requested, the Forest Officer shall be available for inspection.

b. N-normal soils, E-erodible soils.

c. On normal soils, back and fill slopes may vary from the standards specified for temporary Class IV and V roads, within reasonable li

PROTECTION GUIDELINES							ROAD ABANDONMENT	
CONSTRUCTION GUIDELINES							TEMPORARY	PERMANENT
orrow Pits	TIMBER SALVAGE	DEBRIS DISPOSAL	STREAM CROSSINGS		EROSION CONTROL AND REVEGETATION	MAINTENANCE		
			BRIDGES	CULVERTS				
s identified onstruction and site tested rials and ground vels before of borrow areas. ed access or onstructed at an th buffer to off -way borrow pits. its located on t-of-way should parated by veri- th and recontour-	Timber salvage will be done as per timber management regulations.	Total disposal except stripplngs and fine debris (10 cm or less) to be retained for erosion control by spreading on cuts and fills and any other critical areas and walked in by a crawler.	Bridges are the preferred crossing structure and may be required where biological, hydraulic and/or terrain characteristics are significant. Should be designed to facilitate other resource users.	Culverts 1.8 m in diameter or over to have installation supervised by an engineer. Culverts with diameter less than 1.8 m to be supervised by a qualified project manager. All culverts designed for 1:50 yr. flood level. All culverts to be rip-rapped and aproned. Culverts placed in fish bearing streams must facilitate fish passage.	Progressive reclamation (recontouring cuts and fills and revegetation) concurrent with construction. Recommended seed mixture as per the resource handbook to be applied by hydroseeding, mulching, or other approved means. Cross drains and ditch blocks dictated by slope and soil conditions. Drainage water to be diverted off the right-of-way in as short a distance as possible.	Annual maintenance required. Maintenance plan may also be required.	Removal of all crossing structures, additional erosion control measures implemented and active maintenance required.	Complete removal of all crossing structures and engineering aspects of the road. Recontouring of road to original state and fertilizing and seeding of right-of-way.
s)	See class)	See class)	See class)	See class)	See class)	See class)	See class)	See class)
s)	See class)	See class)	See class)	See class)	See class)	See class)	See class)	See class)
s)	See class)	See class)	See class)	See class)	See class)	See class)	See class)	See class)
all borrow pits ated into right- here possible.	See class)	Partial disposal - mechanical or manual cutting of accumulated slash and debris to reduce fire hazard to acceptable levels. Must be spread on right-of-way and walked in by a crawler.	Portable bridges and/or native timber bridges are preferred. (See class)) Properly constructed log fills or ice bridges on intermittent streams. Temporary crossings must be removed before spring breakup.	See class) Designed for a 1:25 year flood level.	See class) Portable seed broadcasters or manual casting may be used.	See class)	See class)	See class)
e class)V temporary	See class)	See class)V temporary	See class)V temporary	See class)V temporary	See class)V temporary	See class)V temporary	See class)	See class)

d. F-favorable, A-adverse, S-sustained, P-pitch.

e. Class)V and V roads have a maximum clearing width of 20 m. Terrain and/or additional facilities on right-of-way may dictate a 20 m right-of-way from the desired 10 m and 8 m for Class)V and V respectively.

f. Clearing widths may be increased with the written approval of a Forest Officer.

(g) Description of measures developed in consultation with the Alberta Forest Service for alleviation of key environmental concerns.

Upon written approval of the detailed plan, the timber operator may submit an application for a Licence of Occupation.

3. Phase III - Construction Phase. This phase includes the request for approval to commence clearing and construction, subject to specific operating conditions. Before clearing, the timber operator will supply detailed plans or designs for watercourse crossings, where determined as being necessary by the detailed plan, for inspection and operational control.

4.3 Planning Temporary Roads

1. Class IV and V temporary roads to cutblocks must be indicated in the Annual Operating Plan and include the location and type of stream crossings required.

The actual type and size of the crossings will be determined by season of use, life expectancy of the crossing and the type and size of the stream. The operator may use a variety of structures including culverts, log bridges, and log or snow fills depending on the conditions at time of intended use. The objective is to minimize erosion and sedimentation, to avoid restricting stream flow and to ensure fish passage in fish-bearing streams.

2. Phase II planning level of detail for permanent roads may be required for crossing permanent watercourses and on critical sites, where such a need is determined during review of the preliminary harvest layout plan.
3. Access for reforestation must be considered in determining the use and life of the road. Erosion control measures shall be maintained until the road is abandoned and reclaimed.

4.4 Upgrading of Existing Roads and Re-use of Abandoned Roads

Proposals to upgrade existing roads or to re-use abandoned roads including realignment, reconstruction or reinstallation of stream crossings, are subject to the requirements and conditions for planning and approval that are applicable to development of new roads.

4.5 Road, Landing, Skid Trail and Stream Crossing Location

General guidelines to be followed in locating roads, landings, skid trails and stream crossings include the following:

1. Roads, skid trails and landings shall be placed in locations which minimize soil disturbance and impact on watercourses by:
   (a) avoiding unstable areas, water source areas, springs and seepages; and
   (b) following natural benches, moderate slopes and ridges to minimize cuts and fills.

2. To minimize erosion and sedimentation, watercourse crossings shall:
   (a) have stable approaches;
   (b) be at right angles to the watercourse;
   (c) be at locations where channels are well defined, unobstructed and straight;
   (d) be at a narrow point along the watercourse; and
   (e) allow room for direct gentle approaches.
3. During the second cut, borrow pits and landings shall not be located in established regeneration on the initial cutovers if at all possible. Unauthorized damage to regeneration is to be promptly repaired by replanting.
4. Road access to shores of lakes and watercourses shall be limited to approved routes.
5. Unless approved otherwise, roads, landings and bared surface areas shall not be constructed within;
   (a) 100 m of the highwater mark of any permanent watercourse;
   (b) 30 m of any intermittent watercourse;
   (c) an ephemeral draw; and
   (d) a water source area including seeps or springs.

4.6 Clearing and Construction of Roads and Landings

1. Merchantable timber on rights-of-way and landings shall be pre-logged before clearing and should be utilized during the same operating season.

2. Road rights-of-way shall be no wider than necessary for construction of a specified class of road in locations other than approved cutblocks, cut-and-fill areas, or where a variable-width right-of-way is aesthetically desirable. It is recognized that reasonable increases in clearing widths may be required on sloping terrain to remove shading and to accommodate rapid drying of the road surface.
3. Debris from clearing of roads and landings shall be disposed of in accordance with the Forest and Prairie Protection Regulations, Part II.
4. A portion of the clearing debris and the strippings from constructing roads and landings shall be retained and used to assist revegetation and erosion control on disturbed areas.
5. Construction in identified problem areas shall be carried out during periods of favourable weather with proper fill material.
6. All necessary safeguards shall be taken to prevent stream sedimentation when building roads near streams.
7. At approaches to watercourse crossings, the organic duff and ground vegetation should be removed only from areas requiring earthwork, and done only at the time of installation to minimize stream sedimentation.
8. Incomplete road grades, subject to erosion, should be cross-drained before final grading to minimize erosion.

4.7 Cross Section

1. Slopes on cuts shall be regular in profile from the top of the cut to the bottom of the ditch, with no hanging banks or sharply-cut ditches.

2. Cut-and-fill slopes shall be within the road standards as specified in Table 3, except for rock cuts.
3. On unstable backslopes timber shall be removed to an acceptable distance from the top of a road.

4.8 Erosion Control and Road Drainage

1. Studies have shown that erosion and sedimentation are most serious during and immediately after construction. Detrimental effects can, however, continue or even increase as the road ages unless corrective measures are taken.

   Erosion control is part of the construction phase. Bared surfaces along rights-of-way require erosion control devices and revegetation.

   Revegetation means a dense vegetative mat that will hold soil in place and minimize erosion. It may also require the planting of shrubs or trees on areas where there is a potential for serious erosion and sedimentation. Establishment of a vegetative cover may require seeding, planting, fertilizing, mulching, contour trenching or other means of slope stabilization.
2. Erosion control and revegetation shall be concurrent with summer grade construction for all classes of roads. Preferably no more than 2 km of bared surface area should be permitted from subgrade construction to completion of erosion control measures at any given time. All erosion control and revegetation measures shall be completed in the same season of construction, during the frost-free period.

3. Erosion control structures shall be in place before decking timber on bared surface areas along road rights-of-way.
4. Proper drainage shall be included in road construction to disperse water and minimize erosion on the road surface, cut-and-fill slopes and ditches.
5. Cross-drainage culverts and other drainage devices shall be placed at an angle to the road to attain maximum efficiency.
6. To minimize erosion drainage structures shall be installed as subgrade construction progresses.
7. Cross-drainage culverts of approved size shall be installed to:
   (a) minimize water movement along ditches;
   (b) divert water off the right-of-way into the surrounding vegetation in as short a distance as possible; and
   (c) provide cross drainage for seepages and springs.
8. Where conditions do not permit cross drainage, other measures such as ditch blocks should be used.
9. Culverts which discharge water onto unstable or fill areas shall be provided with downspouts and/or adequate spillways.
10. Culverts should be rip-rapped, as necessary, to prevent erosion at both inflow and outflow ends.
11. Ditches shall be constructed to the same grade as the road, and sufficiently deep to drain the subgrade.
12. Ditches shall not drain directly into watercourses.
13. Landings used in summer shall be constructed in a manner which minimizes runoff on newly exposed soil.

14. Buffers shall be left where roads on steep slopes are close to important streams. A system of obstructions (e.g., logs, rocks, mounds, etc.) shall be placed between the culvert outlet and watercourse to dissipate the force of water movement where buffers do not effectively retard sediment movement.

4.9 Watercourse Crossings

1. Designs of proposed bridges and culvert crossings of permanent and intermittent streams shall be shown in the Detailed Road Plan or Annual Operating Plan, where determined as being necessary. Plans for all crossings of permanent streams are referred to the Fish and Wildlife Division for comments before approval.
2. Watercourse crossings should be designed and installed in accordance with the Stream Crossing Guidelines - Operational Guidelines for Industry (ENR Report No. T/80).

A summary of these guidelines is presented to provide direction for the planning and installation of watercourse crossings.

(a) Watercourse crossings must be designed and installed to meet peak flows. Permanent crossings of permanent streams should be designed for 1:50 year flood levels, and for 1:25 year flood levels for temporary crossings of permanent streams.

(b) Culvert sizes shall be calculated by using at least two acceptable methods to ensure proper size is determined rather than estimated.

The ENR technical publication, "Sizing Crossings for Eastern Slopes Streams: A Review of Some Common Methods" (Pub. No. T/135) may be used as a guide. It is recommended that two of the following techniques be used to determine culvert size: the Fish and Wildlife technique, the Rational formula, or the Burkli-Ziegler formula. However, the use of other approved methods is acceptable.

3. A permit from the Water Resource Division of Alberta Environment is required for:

   (a) proposals for stream diversion or alteration; and

   (b) watercourse crossings:

   - requiring a culvert capacity equal to or greater than 1.5 m in diameter (the exception to this would be winter operation crossings that use an ice bridge or snowfill; in these situations no permit would be required regardless of the size of the crossing);
   - that require a bridge of more than one span, i.e., a native timber bridge of one span or a Bailey bridge would not require a permit; and
   - associated with Alberta Transportation.

   A detailed description of the work proposed and engineered designs shall be submitted with the plan proposal.

4. If proposed timber operations affect navigable waters, the timber operator shall contact the Regional Director, Marine Services, 549 Howe Street, Vancouver, British Columbia (Phone: (604) 666-6111) to determine the requirements of the Navigable Water Protection Act.

5. Bridge abutments should be placed in areas that do not constrict stream flow.
6. Culverts shall be installed to maintain the natural drainage channel of watercourses.
7. Crossings of fish-bearing streams must be designed and installed in a manner which does not restrict fish passage.
8. Installation of culverts and bridges shall be timed so as not to interfere with fish spawning migration or disturb spawning areas.
9. The outflow ends of culverts should be provided with downspouts or other suitable drains to prevent erosion where hanging culverts on non-fish-bearing streams have occurred. Rock or concrete aprons may be required to decrease water velocity and prevent stream channel scouring.
10. Soil or harmful material shall not be deposited into or pushed through any watercourse or onto the ice of any watercourse.
11. Construction vehicles should ford any permanent watercourse in only one location.
12. Temporary winter crossings on any watercourse shall be completely removed before spring breakup. Where extended use of a seasonal or temporary road is required for activities such as reforestation treatment or future logging operations, temporary stream crossings shall be constructed to adequately meet peak flows.

5. MISCELLANEOUS FACILITIES

5.1 Clearing and Construction

1. Development of a site for facilities such as millsites, permanent campsites, gravel pits, fuel storage areas or waste disposal sites requires a land use disposition, under the authority of the Public Lands Act.
2. Clearing and brush disposal shall be completed in accordance with the Forest and Prairie Protection Act and Regulations thereto.
3. The timber operator shall salvage all merchantable timber felled in the process of clearing activities.
4. During construction, the timber operator will remove and pile strippings in such a manner that they can be distributed evenly over the disturbed area after construction has been completed.
5. The timber operator shall construct a fire guard around a facility site, where directed by a Forest Officer.
6. Protection of a site and its facilities from an advancing wildfire is the responsibility of the timber operator. All necessary precautions shall be taken to alleviate the risk of an advancing wildfire.

5.2 Gravel Pits

1. The timber operator will periodically review the location and number of gravel pits and reclaim gravel pits that are no longer required.
2. The timber operator shall minimize the number of borrow pits and gravel pits required for road construction and maintenance.
3. Removal of sand and gravel from within the highwater mark of a watercourse is prohibited.

5.3 Campsites

1. Campsites shall be located no less than:
   (a) 300 m from the highwater mark of any permanent watercourse;
   (b) 300 m from or out of sight of a numbered highway, whichever is greater;
   (c) 100 m from a public secondary road; or
   (d) 1 km from identified mineral licks and other identified key wildlife areas.
2. The location and construction of a temporary campsite within a timber disposition shall be approved in writing by a Forest Officer before clearing.

5.4 Refuse and Waste Disposal

1. Campsites and equipment maintenance sites shall be maintained in a neat and clean condition.

2. All refuse and garbage shall be progressively burned in a fuelfired incinerator, or disposed of at a municipal landfill site or transfer station. Waste petroleum products shall be disposed of at an approved collection station or as approved by Alberta Environment.
3. All sumps containing effluent from a kitchen or washroom facility shall be properly treated on a daily basis.
4. Sewage disposal shall be conducted in accordance with the Public Health Act.

5.5 Fuel and Chemical Storage

1. Temporary storage of petroleum and chemical products shall be located no less than 100 m from any watercourse.
2. Permanent petroleum and chemical product storage facilities shall be located no less than 300 m from any watercourse. A compacted berm of sufficient height to contain the contents of any fuel tank shall be constructed around the perimeter of the tanks.

6. ROAD AND FACILITY TENURE, MAINTENANCE, ABANDONMENT AND RECLAMATION

6.1 Tenure and Maintenance of Roads and Facilities

1. All roads and facilities intended to remain open shall be adequately maintained.
2. The Company shall submit a tenure and maintenance plan for roads and facilities as part of the Annual Operating Plan submission. This includes temporary, seasonal and all-weather roads that are to be kept open.
3. All-weather roads shall be properly surfaced to reduce rutting and minimize watercourse sedimentation during adverse weather.
4. When not in use, seasonal and temporary roads may require interim remedial erosion control measures to prevent road degradation and erosion.
5. Prompt action shall be taken to restore unsuccessful revegetation or stabilize soils with erosion control measures.
6. Failed stream crossings shall be removed and replaced by adequate crossing structures as soon as possible.
7. Stream crossings shall be kept free of accumulated debris, including that from beaver activity, to avoid obstruction and washing out.

8. Culverts plugged with ice shall be re-opened before spring break-up.
9. Permanent roads may be temporarily closed to public vehicles during specific periods of the year, at the request of the operator or at the discretion of the Forest Superintendent. This is to prevent road grade degradation and watercourse sedimentation during adverse weather.

6.2 Road and Facility Abandonment and Reclamation

1. The objective in reclaiming disturbed surfaces upon abandonment is to:
   (a) return the site to the original or acceptable land form;
   (b) restore the original drainage pattern;
   (c) restore or improve the original level of productivity; and
   (d) re-establish a self-sustaining cover of vegetation consistent with that of the surrounding area to stabilize the disturbed soil and minimize erosion.
2. A schedule for abandonment and reclamation of roads and miscellaneous facilities shall be included in the Annual Operating Plan.
3. Reclamation procedures shall be in accordance with guidelines provided in The Resource Handbook (ENR Report No. 75) and standards provided in the Resource Road Planning Guidelines for the Green Area of Alberta (ENR Report No. T/25).

A summary of The Resource Handbook is presented as it applies to timber harvesting.

(a) Skid trails, landings, roads that are not required to access second cuts such as internal cutblock spur roads, and other disturbed surfaces shall be permanently put to bed when no longer required, by:

(i) scarifying and leveling to an acceptable land form (in areas of high visual sensitivity, the timber operator may be required to recontour roads to the original land form);

(ii) removing all watercourse crossing and drainage structures and backsloping approaches to an acceptable slope;

(iii) cross ditching to disperse run off and suspended sediment into undisturbed areas;

(iv) rolling back topsoil strippings and revegetating bared surface areas to stabilize soils and restore site productivity; and

(v) reforesting disturbed surfaces inside cutovers.

(b) Roads required to access second cuts shall be temporarily put to bed when not in use unless otherwise directed, by:

(i) removing all watercourse crossing and drainage structures and backsloping approaches to an acceptable slope, unless otherwise approved in the Annual Operating Plan;

Watercourse crossings approved for retention shall be monitored, listed in operating plan submissions and adequately maintained.

(ii) cross-ditching to disperse runoff and suspended sediments into undisturbed areas; and

(iii) Roads being put to bed may be reclaimed in a manner that only allows intermittent trail access for follow-up reforestation work or other public uses.

GLOSSARY

Access Road - any road connecting more than one cutblock.

Approved-for-Layout - a stage of AOP approval where the layout configuration has been referred, reviewed and approved to the point where the Company will be able to proceed with marking block boundaries in the field.

Breast Height (B.H.) - 130 cm above ground level.

Contingency Cutblock - area of accessible wood which would be available for emergency supply at any time of the year.

Cutblock - basic cutting area of merchantable timber designated for removal in one cutting operation.

Cut Plan Area - division of the operations having well-defined boundaries established for the purpose of controlling operations during implementation of the operating plan that will sustain operations for a period of three to five years. This could be a sub-watershed or a group of sub-watersheds. It is used synonymously with "Working Circle" as given in the Table I and Table II Silviculture submissions.

First Cut - timber that will be cut during the initial harvest operation of the cutting cycle.

Harvest Sequence - order that cut plan areas will be harvested.

Key Wildlife Area - interest area for referral to Fish and Wildlife Division.

Permanent Reserve - area of timber exempted from harvest.

Residual - standing unmerchantable coniferous or deciduous trees left on a cutblock after harvesting.

Rotation - planned number of years between the formation of a stand and its final cutting at a specific stage of maturity. This includes a regeneration establishment period.

Second Cut - timber designated for removal which will be cut during the second harvest operation of the cutting cycle.

Soil Damage - degree of disturbance to soil that has resulted in a loss of site productivity.

Stream Channel - area of a watercourse to the height of annual peak flows.

Strippings - layers of topsoil and fine debris above mineral soil.

Stump Height (S.H.) - 30 cm above ground level.

Subwatershed - an area drained by a permanent stream, which is part of a larger watershed.

Visual Sensitivity - vulnerability of a forest landscape to visual impacts based on the combination of physical quality, viewing opportunity and viewer characteristics.

Watercourse - bed and bank of a river, stream or creek, the shore of a lake, lagoon, swamp, marsh or other natural body of water, whether it contains or conveys water continuously or intermittently; is to be inclusive to the normal highwater mark.

Water Source Area - that portion of a watershed between the valley breaks of a permanent, intermittent or ephemeral watercourse where soils are water saturated and/or surface flow occurs and contributes directly to stream flow.

APPENDIX

ANNUAL OPERATING PLAN SUBMISSION REQUIREMENTS

A. General Development Plan Requirements

The Company shall submit with the Annual Operating Plan, a 5-year General Development Plan that will illustrate the cut sequence and road development for a five year operating period. The plan will include a report which contains the following information:

(a) Harvest sequence and volume projection by year for the term of the development plan;

(b) Mill requirements for the term of the development plan from all sources: company operations, salvage wood and purchase wood;

(c) 1:100 000 scale map showing harvest sequencing by cut plan units, present roads to be used, and proposed main haul road development;

(d) Road development schedule which indicates a schedule for plan submissions and construction;

(e) Identification of key issues that will influence planning during the term of the development plan such as timber condition, removal of second pass blocks and the integration of watershed, wildlife, areas designated for summer logging, recreation and other resource concerns; and

(f) Comparison of actual production versus AAC for the previous five years.

B. Annual Operating Plan Requirements

1. Stand and Site Assessments:

Harvest layout shall be based on detailed stand and site assessments. Assessments shall involve the following.

(a) Enhancement of Phase III typing.

(b) Categorization of stands according to the following condition classes:

(i) Stands damaged by blowdown, insects, disease or other causes;

(ii) Overmature stands;

(iii) Unstable stands;

(iv) Stable stands with decelerating growth;

(v) Stable stands with normal growth;

(vi) Stands with accelerating growth; and

(vii) Immature and unmerchantable stands.

(c) Watershed assessment identifying sensitive and unstable soils, steep slopes, streams and class, springs and seepage areas, and fish-bearing streams.

(d) Identification of key wildlife habitat.

(e) Assessment of logging impact on soil, wildlife, fisheries, watershed, aesthetics, recreation and other resource concerns.

(f) Assessment of possible alternative harvesting methods in sensitive and difficult areas.

Stand and site assessment information should be illustrated in tabular form and on 1:15 000 maps separate from the harvest layout design maps. Stand and site assessment tables should include the following: timber types, type number, location, stand condition class, age, volume, soil condition and slope.

2. Detailed Harvest Plan:

The Detailed Harvest Plan shall consist of the following

(a) A Detailed Harvest Plan Report which includes:

(i) Report on confirmed road and cutblock layout for year one and two of the development plan;

(ii) Report on projected road and cutblock layout for years three and four of the development plan;

(iii) Report summarizing proposed development for year five of the development plan;

(iv) Listing of confirmed and projected access roads indicating construction schedule, length, block to be serviced, types and sizes of stream crossings and date of abandonment;

(v) Listing of the approval status of all proposed cutblocks;

(vi) Listing of all blocks with outstanding conditions and schedule of work to be completed;

(vii) Cutblock listing tables indicating: block number, location, timber type number, harvest by operating season and year, volume and area;

(viii) Listing of second pass blocks indicating: block number, location, timber type number, volume and area;

(ix) Mill and wet ground contingency cutblock listing; and

(x) Report on salvage and purchase wood programs.

(b) Harvest Layout Design Maps using 1:15 000 scale Phase 3 Inventory Base Map and showing:

(i) confirmed block layout for the two upcoming operating years and projected layout for the ensuing two years;

(ii) confirmed access road layout and classes for the upcoming operating year, and projected road layout and classes for the ensuing two years (spur roads shall be indicated where a detailed cutblock plan is required);

(iii) second pass blocks;

(iv) contingency blocks;

(v) deferred timber;

(vi) unmerchantable types;

(vii) cutovers and years of cut and treatment;

(viii) permanent reserves;

(ix) inoperable areas;

(x) location and types of watercourse crossings (size should be indicated if culverts are used);

(xi) location of watercourses and classification;

(xii) location of springs, seepages and water source areas, where identifiable;

(xiii) location of steep slopes, unstable and sensitive soils;

(xiv) key wildlife areas;

(xv) proposed areas for year 5 of the development plan showing: merchantable types, unmerchantable types, permanent reserves and inoperable areas; and

(xvi) trapline cabin and trail locations which are known or have been provided by the trapper(s), Fish and Wildlife Division or the Alberta Forest Service.

(c) Detailed Cutblock Plans shall be submitted where determined as necessary, for sensitive or critical blocks which are scheduled for years 1 and 2 of the development plan. The plans may consist of:

(i) sketch maps (suggested scale 1:5 000) showing:

- location of roads, landings and main skid trails;
- skidding direction;
- location of streams and classification;
- location and type of watercourse crossings (size should be indicated if culverts are used);

- terrain features which may have impact on the operation including springs, seepage, water source areas, steep slopes and sensitive soils; and
- factors such as protective buffers for watercourses and key wildlife and aesthetic values which may have impact on the operation.

(ii) Brief management prescription which includes:

- stand and site description;
- explanation of resource concerns; and
- harvesting, reforestation and reclamation prescriptions.

(iii) Criteria for determining sensitive blocks could include:

- blocks located in areas of broken topography with unstable and sensitive soils;
- blocks with average slopes greater than 30 per cent;
- blocks with high drainage densities;
- blocks containing protective buffers proposed for harvesting; and
- blocks located in key aesthetic, wildlife and watershed areas.

3. Road Maintenance and Abandonment Plan and Maps:

The Road Maintenance and Abandonment Plan and Maps shall address:

(a) Roads to be kept open, maintenance program and problems areas;

(b) Roads to be temporarily and permanently abandoned, work required, schedule and description of problem areas;

(c) Summary and status of work completed in the previous year;

(d) Inventory of stream crossings to be maintained on temporarily abandoned roads; and

(e) Identified erosion problems on abandoned roads.

4. Fire Control Plan:

The Fire Control Plan shall be submitted as per the Forest Management Agreement and the Forest and Prairie Protection Act and Regulations thereto, for timber operations planned during the fire season April 1 to October 31.

5. Reforestation Plan:

The preferred Reforestation Plan submission should consist of Tables 1 and 2, or an otherwise approved format. The following summarizes the purpose, submission and completion of the tables.

(a) Table 1: Silviculture Report

PURPOSE:

Table 1 provides a complete summary of new cutblocks, treatments, (by type) and/or surveys that were completed during a specific timber year. The information is summarized on one table by company, management unit, and/or cut plan area/compartment.

TABLE 1
SILVICULTURE REPORT

TM 253

Treatment, Survey & New Cut Block Information

Date Submitted: Yr. ____ Mo. ____

Timber Year: May 1, _____ to April 30, _____

Company _____

Management Unit _____ Licence _____ Working Circle _____ Compartment _____

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
Block Number	Area Cut (ha)	New Blocks Mo. Cut	Total Area Treated (ha)	REFORESTATION TREATMENT								REGENERATION SURVEY				Comments

Table 1 is to be completed by the Company for the purpose of updating and/or amending the individual cutover records. The information presented in this table will facilitate the Alberta Forest Service to update their computerized cutblock records.

SUBMISSION:

In accordance with Section 131.1 of the Timber Management Regulation, all forest products companies are required to submit to the Minister of Forestry, Lands and Wildlife a consolidated report (Table 1) detailing all silvicultural treatments. The report is to be submitted by the following dates each year

(a) On or before November 30:

- All new cutblocks for the period May 1 to November 30.
- All treatments and surveys for the period May 1 to November 30.

(b) On or before April 1:

- All new cutblocks for the period December 1 to March 31.
- All treatments carried out during the period December 1 to March 31.

COMPLETION:

Timber Year - Information based on a particular timber year May 1 to April 30 (e.g., 1982/83 timber year - surveys, treatments and new blocks for the year and month 8205 to 8304).

Company - Name of company having the reforestation responsibility.

Management Unit - The AFS management unit in which the harvesting and/or treatments were carried out.

Working Circle/Compartment - The working circle and compartment in which the FMA holder carried out the harvesting and/or treatments.

- A separate Table 1 is to be submitted for each working circle/compartment.

1 Block Number - Company block number as recorded on the Annual Operating Plan.

2 Area Cut (ha) - The area cut for that particular block in hectares (ha) as determined from traversing or aerial photos.

3 New Blocks Month Cut - For all new cutblocks, enter the month on which the block received skidding clearance. If the block is incomplete, enter "I" in this column.

4 Total Area Treated (ha) - Enter the total area of the block that was treated. This will indicate complete or partial treatment of a block from the information reported in columns 5 to 11 (e.g., block area is 20 ha - 10 ha scar. and 10 ha planted. Was the entire block treated, or was only 10 ha treated and 10 ha left for natural? In this case, 10 ha would be entered in column 4).

5 & 6 Area Scar. & Mo. (ha) - Area of the block that was scarified and the month in which the work was completed.

7 & 8 Area Seeded & Mo. (ha) - Area of the block that was seeded and the month in which the work was completed.

9 & 10 Area Planted & Mo. - Area of the block (ha) that was planted and the month in which the work was completed.

11 Species & Type - Enter the species that was planted and the type (e.g., SW - container).

- Enter the species that was used for the seeding project.

12 LFN (ha) - Area of the block that Company plans to leave for natural (LFN) regeneration as determined by a post-harvest survey.

13 Month - The month in which the regeneration survey was completed.

14 Stocking % - The stocking per cent for the particular block as determined from the regeneration survey.

15 Area SR (ha) - The hectares that are satisfactorily regenerated (SR) as determined by the regeneration survey.

16 Area NSR (ha) - The hectares that are not satisfactorily regenerated (NSR) as determined by the regeneration survey.

(b) Table 2: Annual Silviculture Plan

INTRODUCTION:

Table 2 provides a listing of all NSR cutblocks summarized by cut plan area and year of cut. The NSR blocks indicated on Table 2 will have the updated treatment and survey information that the Company provided to the Alberta Forest Service in Table 1.

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(SVCR14)

DATE: 11/26/87

TABLE II - N.S.R. DETAIL PLANNING REPORT: AFS-0
DISPOSITION: CTLE120004 COMPANY:
RECORD TYPE: CUTBLK CUT TYPE: CC HARVEST TYPE: CONIFEROUS
(FOREST : WHITECOURT)
TIMBER YEAR: MAY 1, 19__ TO APRIL 30, 19__

YEAR CUT	AFS SEQ#	FIELD#	CUT AREA	NSR AREA	SURVEYS %	YR	TY	TREATMENTS AFTER LAST SURVEY: LFN AREA	YR	SCAR AREA	YR	SEED AREA	YR	PLNT AREA	YR	PROPOSED REFORESTATION TREATMENT: SCAR.	SEED.	PLNT.	SRVY.	PHS.	LFN.
69	0581950051	1	7.7	7.7	040	83	N	.0	00	7.7	85	.0	00	7.7	85						
	0581950053	3	9.5	9.5	067	83	N	.0	00	9.5	85	.0	00	9.5	85						
	0581950055	5	1.9	1.9	067	83	N	.0	00	1.9	85	.0	00	1.9	85						
	0581950056	6	1.0	.6	067	83	N	.0	00	1.0	85	.0	00	1.0	85						
	0581950057	7	2.3	1.6	067	83	N	.0	00	2.3	85	.0	00	2.3	85						
*TOTAL DISP. CTLE120004			22.4	21.3				.0		22.4		.0		22.4							

PURPOSE:

In accordance with Section 131 of the Timber Management Regulation, Table 2 is to be used by the forest products company for the development and submission of their annual silviculture plan to indicate those blocks that are to be treated and/or surveyed in order to comply with the Timber Management Regulation.

SUBMISSION:

Table 2 is to be submitted to the Alberta Forest Service by May 1 of each year, covering the work proposed for that particular timber year May 1 to April 30. In addition, NSR blocks that will not be treated and/or surveyed under the proposed silviculture plan should be indicated with a year and month in which the work will be carried out in future plans.

COMPLETION:

Under the heading, "PROPOSED SILVICULTURE TREATMENT", enter the following information for each block listed.

TYPE OF TREATMENT:

1 Scarified	- Hectares to be scarified this timber year. - Proposed year and month if block is not planned for scarification during this timber year.
2 Seed	- Hectares to be seeded this timber year. - Proposed year and month if block is not planned for seeding during this timber year.
3 Plant	- Hectares to be planted this timber year. - Proposed year and month if block is not planned for planting during this timber year.
4 Survey	- Hectares to be surveyed this timber year.
5 Post-harvest Survey	- Hectares to be post-harvest surveyed this timber year. - Proposed year and month if block is not planned for post-harvest survey during this timber year.
6 Season	- The season in which the company plans to carry out the proposed silvicultural treatments (i.e., spring = sp, summer = s, winter = w).

NOTE: New cutblocks and treatment information for the period April 1 to April 30 is to be indicated on Table 1 and submitted as an appendix to the annual silviculture plan (Table 2) on May 1 to maintain an up-to-date status on the computerized records.

REFERENCES

Department of Energy and Natural Resources, Alberta Forest Service, Forest Land Use Branch, Resource Road Planning Guidelines for the Green Area of Alberta, ENR Report No. T/25, Edmonton, 1982.

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Department of Energy and Natural Resources, A Policy for Resource Management of the Eastern Slopes, Revised 1984, ENR Report No. T/38, Edmonton, 1984.

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